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Title of the Invention:

VENDING MACHINE WITH HORIZONTAL
PRODUCT PRESENTATION

BACKGROUND OF THE INVENTION

This invention relates generally to vending machines and more particularly to an improved vending apparatus adapted to deliver selected packaged articles upon the actuation of one of a plurality of helical feeder coils overlying a supporting surface upon which packaged articles are disposed. The helical feeder coils rest in slots on the supporting surface such that part of the coil is above and part of the coil is below the supporting surface, so that the articles rest directly on the supporting surface without any support from the helical feeder coil.

In most earlier machines of this type, the articles rest within the convolutions of the feeder coils so that the long dimension of the articles is perpendicular to the convolutions of the coil, i.e., the articles are generally disposed vertically. This requires feeder coils with convolutions that are substantially larger than necessary to hold the articles. Furthermore, the articles are not held firmly within the feeder coil, but can move about, which can cause feeder jams. Finally, this arrangement takes up unnecessary vertical space within the vending machine, limiting its article holding capacity.

Coin-controlled vending machines incorporating drivable members for separating, retaining, advancing and discharging articles held horizontally are shown in the U.S. Pats. to Krakauer et al, Nos. 3,269,595, issued Aug. 30, 1966, 3,344,953, issued Oct. 3, 1967, and 3,941,279, issued Mar. 2, 1976 (see prior art Fig. 1).

Several disadvantages are inherent in such machines as above described. In the two earlier patents, the articles are not supported directly on the shelf, but rather on a longitudinal bar that resides within the convolutions of the feeder coil. This horizontal bar adds unnecessary complexity to the apparatus and, in addition, may cause the feeder coil to jam if the length of the feeder coil and bar is excessive. The third patent shows articles resting directly on the shelf, but not between the convolutions of the feeder coil. Instead, the articles are moved along the shelf by a pair of arms that extend outward from the feeder coil and traverse most of the compartment in which the article rests. This adds unnecessary complexity and, in addition, prevents adjacent feeder coils from being disposed close to one another,

which in turn limits the article holding capacity of the shelf. These prior art machines also waste significant vertical space about the articles to be vended as shown in Fig. 1.

There is a need for an improved vending machine that simplifies the structure of the feeder coil and shelf while providing increased article holding capacity.

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SUMMARY OF THE INVENTION

A vending machine with a cabinet for articles having a long dimension and a short dimension. A multiplicity of shelves are supported in cabinet. Helical feeder coils rest within slots on each shelf. Each helical feeder coil is adapted to receive articles in its convolutions with the articles slidably supported by the shelf along the articles' long dimension. The articles are separated, but unsupported, by the helical feeder coil. Motors rotatably drive the helical feeder coils for moving the articles to be vended.

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BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a front elevational view of a vending machine of the prior art.

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FIG. 2a is a front perspective view of a vending machine of the present invention broken away.

FIG. 2b is a front perspective view of an article to be vended by the present invention.

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FIG. 3 is a front perspective view of a vending machine shelf of the present invention with articles resting thereon.

FIG. 4 is similar to Fig. 3, but with the articles removed to show the structure of the shelf.

FIG. 5 is a front perspective view of the helical feeder coils and motors of the present invention.

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FIG. 6 is similar to Fig. 3, showing one embodiment of a vending machine shelf of the present invention, wherein the opposing feeder coils rotate in opposite directions.

FIG. 7a is a front elevational view of one embodiment of a vending machine shelf of the present invention, wherein part of the feeder coil convolutions project below the slot.

FIG. 7b is a front elevational view of a second embodiment of a vending machine shelf of the present invention, wherein the feeder coil convolutions rest on a curved support structure.

DETAILED SPECIFICATION

Referring to Figs 2 through 7, the present invention may be appreciated. The vending machine 10 generally comprises a cabinet 12 with a multiplicity of low profile shelves 14 supported within the cabinet 12. Each shelf 14 has a front end 16 a back end 18a, top surface 20 and a bottom surface 22. The vending machine further includes a discharged opening 24 shown in Fig 2a from which articles A, shown in Fig 2b, are dispensed. Articles A are generally described as each having a short dimension S and a long dimension L which will be appreciated herein.

Referring to Figs 3 through 6, the unique low profile shelf 14 structure of the present vending machine 10 may be appreciated in detail. Each low profile shelf 14, includes six slots 26 between the front end 16 and the back end 18. Each slot 26 has two sides or shelf edges 26a and 26b which support helical feeder coils 28 which rest in the slots 26. This arrangement contributes to the simplicity of the invention as well as the low profile of each shelf 14.

Fig 4 shows that cabinet brackets 15 may be mounted within the cabinet 12 as well-known by those skilled in the art. Each pair of brackets 15 will support three shelves 14 in a compact fashion as opposed to a single shelf that is known as in the prior art. Dividing up shelf 14 are pairs of guide rails 24 and 36, one pair for each slot 26. The top surface 20 of the shelves are divided into article A compartments by guide rails 34 and 36 while helical feeder coils 28 glide in slots 26, partially depending below. Articles A rest on their long dimension L presenting to the consumer their front surface with advertising. Articles A are supported by the top surface 20 of the shelves 14 and are kept in position by guide rails 34 and 36 and are further moved along for vending by helical feeder coils 28.

The helical feeder coils 28 are adapted to receive articles A between adjacent convolutions 30 at an acute angle α to the slots 26 as shown in Figs 3. The angle α is determined by the pitch of the helical feeder coil 28 in the slot 26. To support this offset presentation of articles A, one side 26a of shelf 14 adjacent 26 is longer than the other side 26b. Thus, the shelves 14 deliver articles A at an acute angle β to the slots 26 as is shown in Fig 4. Preferably the vending machine comprises six slots 26 with six helical feeder coils 18 and motors 32 for driving each coil 18. As may be appreciated in Fig 3, all feeder coils 18 rotate in the same direction, as they equally present articles A to be vended.

Referring to Figs. 4-6, it may generally be appreciated that each shelf 14 may be divided in half with one half of the feeder coils 18 rotating in a clockwise rotation and the other remaining helical feeder coils 18 rotating in counter clockwise rotation as shown in Fig 6. By this arrangement the presentation of articles A is generally directed towards the center line of the cabinet 12 of vending machine 10.

The vending machine 10 has increased capacity. It may be appreciated in both figs 3 and 6, by either rotating arrangement, each shelf will generally hold approximate one hundred twenty articles A to be vended in an extremely low profile design. Upon placement of three shelves 14 into brackets 15 of Fig 4, the space which normally holds one shelf with one hundred eighty articles A, will now double its capacity to three hundred sixty articles A.

Referring to Figs 4, 7a and 7b, alternative shelf 14 constructions may be appreciated. Fig 7a shown slots 26 in shelf 14 to permit feeder coils 28 to nest into slots 26 wherein the edges a 26a and 26b support the coils 28. This arrangement is shown in the right side of Fig 4 with the three smaller feeder coils 28. An alternative to having a slot 26 through the shelf 14 will be the curved support 26c as shown in Fig 7b. This arrangement is shown on the left side of Fig 4 with the larger feeder coils 28. The benefit to this design will allow a smaller coil 28 to be driven in the slot 26c that otherwise would fall through the slot 26 between edges 26a and 26b.

In operation, new shelf brackets 15 are mounted within cabinet 12 of the vending machine 10. The shelves 14 are mounted between brackets in a slidable arrangement. The shelves 14 may be moved out for loading of articles A into the

machine 10. As a consumer places money into the vending machine 10, a selected motor 32 is operated to advance a helical feeder coil 28 to present an article A forwardly to drop off of the top surface 20 of shelf 14, due to either edge 26a or 26b being shorter than the other, and to permit the article to be dispensed out of discharge opening 24. While this machine 10 uniquely provides the front surface of article A for easy recognition by the consumer, the present invention also doubles the capacity of the vending machine 10 compared to other prior art vending machines. This is simply because there is no waste in vertically space, as is no well known in the prior art, as in Fig 1.

10 The present invention may be embodied in other specific forms without departing from the spirit or the essential attributes thereof, and it is therefore desired that the present embodiment be considered in all effects as illustrative and not restricted, reference being made to the appendent claim rather than the forgoing description indicate the scope of the invention.